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ABSTRACT

Three papers exploring facets of the teaching process are presented in this report. The papers are part of the Didactic Process Analysis (DPA) Helsinki research project. The DPA research team, composed of educators investigating instructional processes, has, since 1967, examined taxonomies and classifications of teaching processes. The first paper, "Investigations into the Instructional Process (DPA Helsinki)" describes the background, goals, and approach of the DPA team. Research was conducted on the development of a DPA classification of instructional events, joint lesson planning by teachers and students, and the use of the DPA taxonomy in characterizing the instructional process in selected classrooms in Finland. In the second paper, research on teacher decision making is reviewed. One study in particular is cited because it showed that teachers did not plan lessons on the basis of objectives. The thesis of the third paper is that conflicts in terminology present a barrier to effective teacher education. A comparison of taxonomies is offered, and the DPA paradigm of instructional processes is introduced. References follow each of the papers. (FG)

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May 1981

CLASSROOM ANALYSIS: CONCEPTS, FINDINGS, APPLICATIONS

DPA Helsinki Investigations III
edited by
Erkki Komulainen and Pertti Kansanen

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RESEARCH BULLETIN

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OPA Helsinki Investigations III

edited by

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CLASSROOM ANALYSIS: CONCEPTS, FINDINGS, APPLICATIONS

Helsinki 1981

Preface

The DPA Helsinki research project is based on an intensive team work. The first paper of this volume briefly describes the methodology and results of the main part of this project.

Professor emeritus Matti Koskenniemi has been the originator and stimulating leader of this research for a decade or more. His enthusiasm, fresh and original thinking and admirable scientific productivity has been a source of inspiration to the whole research group.

Since 1977 the researchers interested in teaching process studies have continued their cooperation in the form of weekly colloquims chaired by Ass. Prof. Erkki Komulainen. The writers of the first paper like to point out that although Matti Koskenniemi does not appear in the list of the author names he still is the intellectual father of this paper.

The other two papers touch upon acpects which have shown to be important themes when dealing with didactic processes.

Phil. lic. Paul Hellgren has given invaluable advice in editing the papers. The authors of each paper are naturally fully responsible for the content and language of their papers.

We express our gratitude to the Dean of the Faculty of Education, Prof. Erkki A. Niskanen for accepting this volume to the Research Bulletin series.

Editors

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Investigations into the Instructional Process (DPA Helsinki)

by

Erkki Komulainen, Pertti Kansanen, Kai Karma,
Marja Martikainen, and Kari Uusikylä

1. Background, goals and approach of the DPA Helsinki project

This article deals with the research done by the team DPA Helsinki (short for Didactic Process Analysis) since 1967. A preceding follow-up study on the development of young elementary school teachers was carried out during 1954-61 in order to elucidate to what extent the entrance examination procedures used in teachers colleges was valid (KOSKENNIEMI & Al.. 1965). The development of students was followed during the four years of teacher training and during the first three years in service. Observation-based criterion ratings proved to be rather unsatisfactory because no research model representing the instructional process as a whole was available. This lack was also reflected in the difficulty to evaluate the process of teacher training. The situation led to a decision to start a search for the structure and dynamics of the instructional process per se.

The process of developing a taxonomy for classification of instructional events formed the first part of the DPA project. In the years 1967-73 the DPA research team mainly made use of the category systems developed by BALES, BELLACK and FLANDERS. To integrate together three taxonomies, each based on a different theoretical background, was a complex task. The solution - the DPA Helsinki taxonomy (KOSKENNIEMI, KARMA & MARTIKAINEN 1974) - is based on pedagogical moves defined by BELLACK. Aspects of socio-emotional behavior and modes of teacher

influence have been synthetized from BALES' and FLANDERS' taxonomies. In addition to unit coding, the so-called period coding consisting of eight separate areas is built into the system. The areas are: A. division of labor & responsibility, and grouping of pupils; B. formal characteristics of verbal communication; C. content according to the system of knowledge and skills, and relevance for pupils; D. climate of the classroom; E. authority relationships; F. flexibility; G. pupils' participation; and H. goal-related behavior.

In planning the second, post-taxonomical phase of DPA Helsinki (1973-77) two main methodological problems emerged. The first is connected with the statement that instruction proceeds as a continuous chain of situations, which is balanced in some way or other. Secondly, if purposefulness of instruction is to be taken account, the question arises of how variables representing goal-oriented behavior are to operationalized. Manipulating instruction in such a way that planning is separated from the ordinary flow of teaching-learning situations offers a solution. During the joint planning the teacher discusses with the pupils what to learn, and how and why to study it during the next few days. It is apparent that after such planning the participants are likely to have some purposefulness in their goal-related behavior while the plans are being realized.

The early phase of the DPA was characterized by a positivistic, hard-data approach and by some features from phenomenology. Our thinking grew wider and more open. PHILIP W. JACKSON, HERBERT A. THELEN and ARNE TRANKELL (Sweden) can be mentioned here as scientists whose thinking has had a considerable influence on us. We did not - and we still do not - have a comprehensive theory of teaching for generating a research model which could be empirically tested. The starting point

was, however, the definition of instruction: it is a process of interactions between teacher and students.

We shall list and discuss some additional methodological decisions which more precisely define the approach we have adopted:

1. Process-orientation. Instruction is conceptualized as interaction that proceeds in time.
2. Multidimensionality. Rather many technically independent aspects are needed to cover the essential features of instructional situations.
3. Naturalistic setting. We try to disturb the natural classroom life as little as possible.
4. Holism. It implies that the whole dominates over its parts. Instruction is a system consisting of many interdependent elements.
5. Quantification vs. statistical inference. Information is collected by quantitative means, but the rigid scheme of statistical inference is only one criterion among others.
6. Joint use of qualitative and quantitative data. When we give up the stringent demand on quantification, this means that we collect non-numerical data on those sources of information which are important for interpreting and understanding the whole set of interrelated facts. Using the so-called soft data also means that we pay special attention to the contextual facts. This kind of whole picture can be created on both micro- and macro-levels. For classroom research this means that besides observational data, we have to gather holistic and situation-bound perceptions, which cannot be made from a video-tape. On the macro-level it means, first, that we have to map the share of responsibility, authority relationships, and teacher behavior in extra-curricular activities. Secondly, it means that the demographic-ecological environment with its special

features must be included into the investigation scheme. This is what we understand by the expression hermeneutic approach. This scientific tradition does not give strict rules for individual cases of how to combine hard and soft data. When we use the hermeneutic approach we have to solve those problems case by case.

7. No use of product-criteria of effectiveness. The studies dealing with the research on teaching can be classified into several types according MITZEL (1957) or DUNKIN & BIDDLE (1974). Predictive studies including presage and product variables are numerous. Process-product research has also been done. The OPA Helsinki project belongs to the rather rare type of process research in which the knowledge of the process and its nature is in the foreground and the criteria of effectiveness do not exist at all or are of process type. We have adopted this approach very consciously. We feel that the inclusion of product criteria has a tendency to bias the view upon instructional process. We do not claim that the question of effectiveness is unimportant. We only say that a basic approach without short-sighted applications may, in the long run, show to be fruitful, also for the efficiency studies.
8. Social context of instruction. Instruction is interaction which proceeds within a social setting.
9. Goal-orientation. Pedagogical meaning is essential to instruction. We have tried to gain goal-awareness by joint planning.
10. Content of instruction. Content is not of primary importance. We regard it as one aspect in the classification system. We do not include it as a variable in the research paradigm. There are also other important elements such as the way interaction is organized.

During the taxonomic phase (phase one) about 170 lessons were

videotaped and analyzed. A studio room with video equipment is located in the Institute. Since 1967 five classes have successively gone their school in this classroom. Each set of pupils stayed a period of two years under observation. In this way we had several intensive, follow-up cases during the first phase. In the beginning, we made a threefold classification, separately with BALES', BELLACK's and FLANDERS' instruments. The DPA taxonomy was created through statistical procedures aimed at these three independent classifications. With the logical approach added, the final instrument started to emerge (KOSKENNIEMI & KOMULAINEN 1974).

During phase two we videotaped a total number of 150 lessons. 66 are about the joint planning of teaching and are distributed evenly during three terms. They represent the type of lesson during which the teacher and pupils plan together the forthcoming instruction. At the end of the one and a half year research period, a plan for one week was realized and videorecorded in each of the research classes (codes 200, 300, 400, 500 and 600). The week began with joint planning and closed with joint evaluation. The so-called main material from this week consists of 84 videotaped lessons. Code 800 stands for the Institute class. It is a special case because it was small (N=23) and had a long tradition of joint planning. The other five were regular fourth grade classes in the suburban areas of Helsinki. The number of pupils involved was appr. 180.

The purposes of the DPA research were:

- to describe continuous and holistic chains of instructional situations consisting of preactive, interactive and postinteractive phases, and to search for relational invariances both within instructional periods and between periods following each other

- to understand and explain instructional processes in terms of persons participating in the interaction, and on the basis of certain groups of background variables, assumed to be relatively constant during the process, and comprising teacher, student, social structure, and goal variables (see the DPA paradigm, fig. 1)

- to clarify the extent to which educational objectives, stated in the official curriculum and determined during the preinteractive phase of instruction and joint planning, are realized in the interactive process

The intentionality involved in the instructional process is such an outstanding feature of the DPA project that special attention is paid to it, and to joint planning in the following.

2. Some aspects of the DPA Helsinki paradigm

The empirical DPA research is guided by a research paradigm which indicates the theoretical considerations behind the practical solutions. To understand the DPA Helsinki paradigm the reader is to look into the definition of the instructional process. Primarily, instructional process contains interaction between the teacher and the pupils and this interaction is a basic element of the instructional process. The interaction can be either face to face or indirect so that every act of the teacher or the pupils can be interpreted as an element of the interactive instructional process. Secondly, the instructional process is taking place in the life space of the school and then we must include into it besides the usual lessons the activities during the meals, during the breaks, during the school routes, etc. Thirdly, the whole process of instruction aims at the development of the pupils' personality. Finally, this must happen in accordance with educational goals.

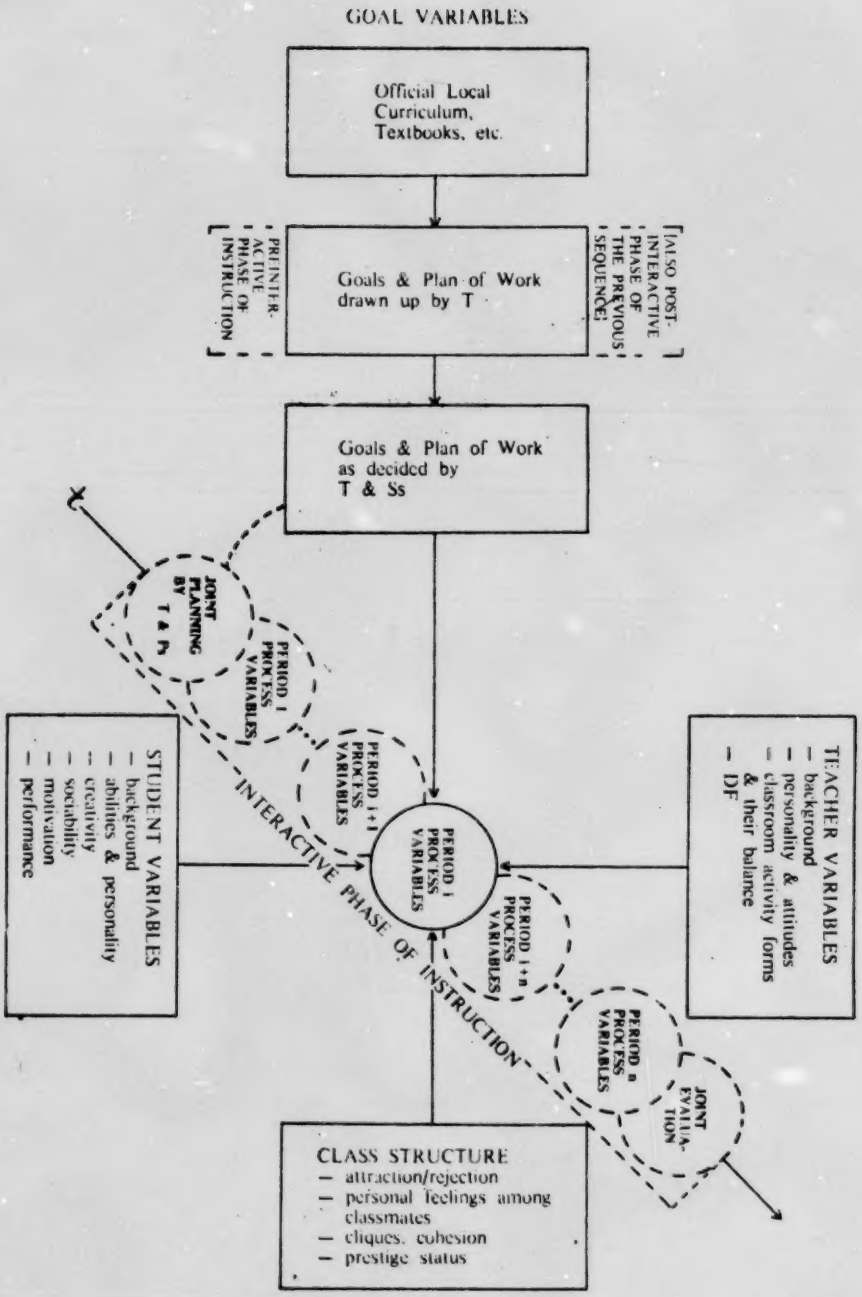

Figure 1. The DPA Helsinki Paradigm

Jackson paid special attention to the teacher's activities performed before the instructional process proper (JACKSON 1962). In his opinion, one must take into account this activity and without considering it one cannot obtain a complete understanding of the instructional process. The basic element of the instructional process is interaction but we agree with JACKSON that we must take into account the beforehand activities as well as those which follow after the class and to which JACKSON did not pay as much attention as to the preactive teaching. In our opinion, the activities of all pupils, together and individually, must not be omitted. These are to have a certain position in our paradigm even though their influence on the instructional process may not be as apparent as the teacher's activity is. Further, according to our definition of instruction the interaction can also be indirect, and that is why we prefer the term "preinteractive" to JACKSON's "preactive" teaching. In accordance with these aspects we divided the instructional process into three phases as follows:

1. The preinteractive phase of the instructional process — The teacher and the pupils make the planning separately. It is mainly the teacher who has the responsibility and who finds and formulates the educational objectives in conformity with the official curriculum. She also prepares an outline of the possibilities of realization and evaluation. The pupils participate by searching for material independently and become familiar with the topic, etc.

2. The interactive phase of the instructional process

   a) The joint planning — The outline of the teacher is examined, the objectives are formulated further, they are arranged according to the prefer-

	ences, the way interaction is arranged is agreed upon as well as the material and the sequence of the instructional situations, etc.
b) The interaction proper	The plan is realized.
c) The joint evaluation	The teacher and the pupils evaluate the instruction together, the success of the plan is discussed, the successes and failures are clarified, the plan is revised, the evaluation of learning outcomes is performed under the control of the teacher, etc.
3. The postinteractive phase of the instructional process	The teacher and the pupils evaluate the instruction separately, the teacher gives grades, and she writes down the experiences, she modifies the plan for the future, the pupils evaluate their efficiency and make decisions about their future work, and complete their weaknesses, etc.

Generally, this kind of division of the instructional process does not contain any manipulation and this is also our aim when dealing with research on teaching in natural settings. However, we particularly emphasize the educational aims and their operationalizations as well as the intentionality or the purposiveness of the teaching behavior. By intentionality we mean the way the educational aims are recognized, understood and finally internalized by the teacher as well as by the pupils. To guarantee this intentionality we have introduced joint planning into the interactive phase of the instructional process. A decision made in planning is a manipulation and it reflects a certain "commitment" as DUNKIN & BIDDLE (1974) present it.

To know if the teacher and the pupils are behaving according to educational aims we must have some criterions for intentionality. This is of importance because the instructional process may seem intentional without any one of its participants having educational aims in mind. The explanation of activities of the type in which the person functions according to goals even though he is not necessarily aware of them von WRIGHT (1971) calls quasiteleological. Educational aims are given in the official curriculum, and it is the task of the teacher to operationalize them and to organize the instructional process according to them. Thus, the first condition of intentionality is that the teacher knows these aims. She is then supposed to understand and interpret and subsume them into her personal way of thinking. The final point in the development of intentional teaching is the internalization of the aims. This means that the teacher makes her decisions and behaves in agreement with the curricular aims. The intentional behavior is mainly seen through the planning activities during the preinteractive phase of the instructional process.

The intentionality of the pupils is closely related to the problem of motivation. It is the intrinsic motivation which is the kind of motivation to be regarded as intentional. The pupils are expected to go through the same process of internalization of the aims as the teacher but with help of the teacher, however. On the practical level this means that the pupils are taken up to plan the instructional process together with the teacher. This is the first phase of interaction and we call it joint planning.

3. The joint planning of teaching

The joint planning of teaching is, by no means, a new idea. It has its roots deep in the progressive educational philosophy. JOHN DEWEY had many kindred spirits in Europe, all of whom emphasized a children's right to take part in the planning of studies. Educational literature abounds with references to the advantageous influences which joint planning has upon pupils. As a rule, it is regarded as a way to reach educational goals expressed at a general level. The most common argument for cooperative planning is that it is the best way to educate democratic citizens. It is also supposed that the climate of schools will be better and the motivation towards studies will be higher than usually (BISHOP 1971, BJERSTEDT 1971, CLARK & STARR 1967, WHEELER 1967).

The joint planning has been the central part of the 'school democracy' which has been realized in the Finnish school system during the seventies. Special school councils have been established, but the administrators have emphasized that the most important level for joint planning is the class where every pupil has a chance to participate in the decision making.

The research classes of the DPA research team had joint planning practised by first making a plan for the next day, then gradually for a week. (The children were only 9 - 10 years old.) A preliminary plan was made by the teacher and the task of the pupils was to complete the plan: to decide in detail about the content areas, and especially, about the activity forms of teaching. Naturally, the planning was realized in the framework of the official curriculum. Every pupil got then the complete plan in order to make preparations for the realization of the plan.

At first the teachers were very uncertain in planning situations. They were given general information by the research group about the principles of joint planning: its general goals, some ways to realize the planning process and so on. They were not told, however, in detail how to plan, although the teachers often asked for detailed directions. The teachers gradually understood that they had to take responsibility for the planning. Afterwards the teachers admitted that it had been a useful experience to be compelled to plan independently. It would have been much more safe to depend on traditions and methods which had become familiar to them during the training years.

It was surprising that the pupils took the joint planning so naturally. It was obvious that they had not yet been conditioned to a normal, stereotyped role of pupil in the interactive game of teaching (LUNDGREN 1972). Three times, at the end of each term, the pupils were asked their opinions about joint planning. They were very positive. As many as 83 - 87 % agreed with such propositions as "joint planning is a pleasant thing", "joint planning makes one understand many things better" and "it is more pleasant to prepare for lessons, when they have been planned beforehand together". Only 13 % of the pupils regarded planning as difficult and 11 % as useless. The teachers reported that their pupils had become more spontaneous, critical and independent during the joint planning period.

The goal variables of the OPA Helsinki system (aspect H) are operationalized through a questionnaire (KOSKENNIEMI & AL. 1974, 23-24) and the empirical findings were as follows. Positive attitudes are seen in the table and they remain as such during the whole research period.

Table 1. Aspect H: Goal relatedness of the pupils
(positive opinion 2, neutral 1, negative 0)

Item	Measurement	F p<	Class 200	300	400	500	600	800	Total
1. Clearness of the lesson plan	1st	.05	1.88	1.90	1.66	1.68	1.69	1.58	1.74
	2nd	n.s.	1.94	1.68	1.67	1.69	1.65	1.86	1.75
	3rd	.01	1.94	1.72	1.50	1.67	1.48	1.80	1.68
2. Pleasantness of the plan	1st	.05	1.41	1.69	1.34	1.29	1.19	1.29	1.38
	2nd	.001	1.41	1.32	1.53	1.14	1.08	1.86	1.37
	3rd	.01	1.59	1.55	1.31	1.15	1.24	1.60	1.41
3. The plan was in my mind	1st	.05	1.84	1.72	1.76	1.42	1.54	1.57	1.65
	2nd	.05	1.59	1.57	1.80	1.45	1.46	1.86	1.61
	3rd	.01	1.88	1.62	1.59	1.48	1.40	1.80	1.63
4. When working according to the plan, I was diligent	1st	n.s.	1.09	1.21	1.00	1.03	.88	1.14	1.06
	2nd	.01	1.25	1.29	1.17	.97	.88	1.33	1.14
	3rd	n.s.	1.25	1.31	1.19	1.11	1.04	1.40	1.21
5. I learnt what was intended to be learnt	1st	.05	1.59	1.62	1.62	1.26	1.31	1.48	1.48
	2nd	n.s.	1.53	1.68	1.63	1.34	1.46	1.52	1.53
	3rd	n.s.	1.66	1.52	1.47	1.44	1.40	1.75	1.53

Administrators in Finland have stressed the importance of every pupil having a chance to influence upon his/her studies at class level. The analysis of the planning processes revealed, however, that this goal was achieved very poorly. The verbal participation was very unevenly distributed among the pupils. The most active quarter used as much as 67 - 86 % of the pupil moves while the most passive quarter resigned itself to 1 - 4 % of those moves. The striking feature was the dominance of the boys in planning. There was a class, coded 500, where the distribution of the moves between boys and girls was 94 % vs. 6 % in spite of the fact that their number was almost the same, 17 boys and 15 girls. There were no clear connections between the planning activity and the

personality or intelligence factors of the pupils.

Although there are some practical problems, the joint planning is, however, one of the best ways to break the traditional interaction models of teaching, the models that have dominated the instructional process so tightly (HOETKER & AHLBRAND 1969). If the joint planning were a normal part of the instructional process, we could have chances to abandon all the lip-service concerning 'democratic teaching' and there could be a chance that the principles would really influence practical teaching situations.

4. DPA Helsinki taxonomy

Observing classroom behavior does not, of course, imply the use of a taxonomy. In some cases it may even be better to begin with an "open mind" and let the situation steer the observer in grouping behaviors into concepts. In the usual case, however, the observer feels confused if he has no frame of reference to help his work. Many things are happening simultaneously, some of these appear important, some self-evident, others are not noticed at all. In addition, it is difficult to keep one's mind really open; if no concepts are consciously applied, the risk of letting one's prejudices work freely is increased.

The taxonomies developed by BALES, BELLACK, and FLANDERS, which have been used as starting points in constructing the DPA Helsinki taxonomy, are all similar in the sense that behavior has been classified into relatively narrow, carefully defined categories which are thought to be basic in the situations the taxonomy is intended for. The quantities of these basic units form the data which are usually statis-

tically described. The part in the DPA Helsinki taxonomy which is constructed in this way is called unit coding. The basic units are move types modified from those developed by BELLACK et al. (1966). The concept of "language game" in which linguistic behavior is seen analogous to a game where players act according to certain rules has been developed by philosophers such as LUDWIG WITTGENSTEIN. Where this analogy is adopted the rules controlling how the "players" use the linguistic moves are to be empirically investigated. This is like reconstructing the rules of, say, baseball by looking at how the players act during the game. The difference is, of course, that we know that there are rules in a ball game but the presence of linguistic rules is mainly hypothetical.

A structuring move (STR) is spontaneous and forward-directed, is not solicited by others, and prepares coming action. In the data studied by the DPA team there were quite many spontaneous pupil moves which were not markedly forward-directed or intended to prepare future action. These are interpreted as structurings which make this category somewhat wider than it is in the original BELLACK taxonomy.

Soliciting moves (SOL) are aimed at getting responses (RES) from other participants of interaction. These categories are similar to the original ones with the exception that SOL moves have been divided into subcategories. It was noted, for instance, that questions concerning subject-matter information (SOL_i) did not correlate, or correlated negatively, with orders (SOL_o), especially when these were connected with classroom management. It was considered to keep such behaviors in one category.

REA moves (reaction) are evoked by something said or done

before. They are not connected to anything as necessarily and self-evidently as REA is to SOL, but are the speaker's free comments, additions, or evaluations. In this sense they are said to be backward-directed although they may serve as triggers for future interaction as well.

The basic units, moves, are analyzed from three different angles or frames of reference. The first of these is the content and its logical form. The categories are freely adopted from BELLACK's taxonomy. FAC (fact-stating) stands for the lowest logical level where things are described as such, where the speaker has not manipulated the information taken from textbooks, previous lessons, or phenomena in his environment in general. When the speaker's own opinion about a subject-relevant matter is in question, the code OPN is used. In explaining (XPL) cause-effect relations and definitions are handled. Because classroom management was often discussed in the material analyzed by the DPA project, there was a need for a new category named MAN (management). The code PER (personal) is used when the speaker relates a topic with his own personal experience. The content and its logical form are coded only when the speaker is the source of information, i.e. they are not used in connection with SOL moves. This makes their total frequences smaller than in the original BELLACK taxonomy.

The second angle from which the moves are looket at and described is that of socio-emotional aspects. The categories are freely adopted from BALES' works on the social climate of small group situations. The eight categories are marked with numbers and can be seen as three groups.In the first group there are expressions of positive feelings of different intensities, in the second negative feelings correspondingly. The third group, categories 4 and 5, was formed for

expressions not clearly emotional but rather cognitively evaluative ("right", "wrong").

The main concept from FLANDERS' category system, teacher's direct vs. indirect influence, is used without subcategories and forms the third dimension on which moves vary. Questions aiming at one relatively clearly definable and predictable answer, direct orders, and lecturing are coded as direct influence. Indirect influence is coded when the teacher uses pupils' ideas, evaluates and comments on them, or asks open questions. The critical variable here is the amount of choice left for the pupils.

The primary aim of the DPA taxonomy is to describe periods as wholes. Periods are defined as sequences of instructional situations devoted to the same task. In most cases a period is equivalent to a lesson. For the description of periods, unit coding was not sufficient as such. Indices based on unit coding; and categories describing larger wholes than units are used in period coding.

Division of labor and responsibility, and grouping of pupils are described by indicating the activity form typical of the period. These may be teacher-centered, pupil-centered, or cooperative. The second area in period coding, formal characteristics of the verbal communication, contains indices such as the share of teacher moves of the total number of moves, content-centeredness and the like, based on unit coding. In the third, area, the content handled during the period is classified into the following categories:
- MC, subject matter planned for mastering symbols (i.e., means of communication) needed in interpersonal contacts.
- KR, subject matter planned to increase knowledge of environment.

- FS, subject matter for adopting formal systems required in mastering the environment (mainly mathematics).
- VS, subject matter which promotes the adotion of religious, ethical, social and aesthetic value systems of the culture.
- MS, subject matter promoting the acquirement of motor skills.

Estimates of the attentiveness of pupils during the period are also used in the third area. Indices such as the share of moves with social-affective properties of the total number of moves, and the share of tension release of moves connected with tension, are used in the fourth area, the emotional climate of the class. These are based on the social-affective unit codings. The fifth area, authority relationships, is mainly similar to the I/I+D -ratio used by FLANDERS: the number of the teacher's moves with indirect influence is related to that of moves which contain direct influence. The sixth area consists of estimates of the flexibility of the teacher. The seventh area consists of estimates about the evenness of the pupils' participation. These estimates are attained both from holistic ratings of the period and from the sequences in unit codings.

The eighth area, goal-related behavior, is different from the rest in the sense that it is based on a questionnaire instead of observation. The pupils are given a questionnaire immediately after the period in question. With it it is tried to estimate how much the pupils had the goals of the lesson in mind during it.

5. Main characteristics of the instructional process in some Finnish classrooms

Instructional process is characterized in the following with means of the DPA Helsinki taxonomy. No consideration is given here to frame variables and to the connections between these and the process.

Division of labor & responsibility, and grouping of pupils (Aspect A)

Table 2. Distribution of Activity Forms (%)

Activity form	Class						Total
	200	300	400	500	600	800	
Teacher-centered							
- Teacher presentation	-	11	7	5	9	17	8
- Teacher questioning	8	38	14	31	38	17	23
- Joint exercises	39	44	58	39	42	2	36
Pupil-centered							
- Individual work	13	3	4	22	4	14	10
- Individual/group performances	30	2	7	3	7	38	17
- Group work	8	-	3	-	-	7	3
Cooperative							
- Instructional discussion	2	2	7	-	-	5	3
- Assembly	-	-	-	-	-	-	-

Activity forms were recorded at 5 minute intervals. The figures in the table are to some extent influenced by the fact that content areas were not equally represented in the classes. Even this taken into account inter-class differences are considerable in the use of activity forms (KOSKENNIEMI 1977).

The characteristics of verbal communication (Aspect B)

The distribution of move types demonstrates the presence of the teacher and pupil roles described by BELLACK. These could also be discerned in the Finnish material: the teacher was mostly questioning, guiding activity, structuring and reacting. About one-half of the pupil moves were RES and one-fourth STR. Although the STR move has been defined in a broader sense in the DPA Helsinki taxonomy than in BELLACK's studies, the Finnish 4th grade pupils seem to be rather spontaneous, especially during joint planning sessions.

Table 3. Distribution of Move Types (%)

Move type		Class 200	300	400	500	600	800	Total	Joint Planning
STR	T	10.74	14.17	10.42	12.45	16.44	13.61	13.13	16.54
	P	6.62	8.26	11.03	10.97	4.56	13.01	8.82	11.91
SOL_i	T	16.61	16.86	15.74	15.07	20.79	10.04	16.14	13.85
	P	2.94	5.58	2.91	4.48	1.78	3.15	3.33	2.80
SOL_h	T	.07	.43	.31	.48	.11	1.17	.41	.04
	P	.00	.03	.05	.11	.02	.05	.04	.00
SOL_o	T	10.91	9.34	11.08	12.38	10.94	6.80	10.31	8.67
	P	1.25	.73	1.52	3.11	1.32	1.50	1.57	1.19
RES	T	1.98	4.20	1.42	4.37	2.66	2.61	2.82	2.68
	P	24.29	20.76	22.97	17.70	22.15	14.06	20.47	18.24
REA	T	15.04	14.64	12.87	10.01	12.72	16.18	13.49	13.08
	P	4.62	2.67	4.58	5.29	2.56	4.86	4.03	7.69

T = teacher, P = pupil

SOL subcategories:

SOL_i = a question to which an answer on fact level is expected

SOL_h = a move which calls for an answer containing some form of logical operation on higher cognitive level

SOL_o = a move containing an instruction how to act or quidance to behave according to behavioral rules
(SOL_s = a move containing a request for suggestion and SOL_d = a move containing a request for quidance are in the table included in this category)

Move types with -M (e.g. RES-M) are ignored

Between the six classes there are logical differences in the distribution of move types. These differences primarily reflect the degree of freedom given by the teacher, and the spontaneity of the pupils. Classes 600 and 800 are two opposite poles in this respect. In class 600 the teacher spoke more than teachers in other classes (63.7 %); the teacher's moves were mostly structuring moves, questions and instructions how to act. The spontaneity of the pupils was rarer (31.5 %) than in the other classes (spontaneity = the share of pupils' STR, SOL and REA moves of all pupil moves). In class 800 the share of teacher talk was only 50.4 %, and 61.5 % of the pupils communication was spontaneous.

The cognitive content of the verbal interaction appeared to be very one-sided. As to the teacher, MAN (management) moves (14 %) and FAC (fact stating) moves (10 %) were the most frequent, while OPN (opinion) and XPL (explaining) were rare (less than 1 %). The latter categories were somewhat more frequent among pupil moves, notably during joint planning.

Table 4. Distribution of Cognitive Categories (%)

Category		Class 200	300	400	500	600	800	Total	Joint Planning
EMP	T	35.34	33.36	34.26	28.24	35.08	28.15	33.54	31.13
	P	16.20	12.41	14.68	17.03	9.59	19.97	14.68	13.69
MAN	T	11.83	11.00	11.80	18.02	17.47	12.10	14.09	10.72
	P	2.42	1.92	6.09	7.83	5.00	6.64	5.05	2.78
PER	T	.07	.10	.00	.02	.02	.05	.04	.00
	P	.68	.56	.32	.25	.64	1.28	.62	1.16
FAC	T	7.66	14.58	6.12	9.17	11.75	11.31	10.07	14.57
	P	24.76	22.54	25.03	15.80	18.05	15.09	20.12	6.59
OPN	T	.03	.12	.16	.29	.08	.75	.23	.55
	P	.40	1.61	1.41	2.53	2.00	4.19	2.02	18.65
XPL	T	.00	.25	.00	.04	.21	.19	.12	.00
	P	.14	.35	.07	.27	.11	.28	.19	.00

EMP (Empty) refers to moves withouth any cognitive meaning.

Emotional climate (Aspect D)

Social-affective expressions during the instructional process were surprisingly infrequent. Categories 1 to 3 (positive emotional state) and 6 to 8 (negative emotional state) were represented in only 6 % of the moves, as little in pupil as teacher moves. During joint planning the social-affective expressions were more frequent in pupil moves. Inter-class differences were considerable in the emotional climate of the classrooms: the share of positive moves of all the social-emotional moves varied between .20 and .67 (for the pupils, respectively, between .16 and .76).

Table 5. Distribution of Social-affective Categories (%)

Category		Class 200	300	400	500	600	800	Total	Joint Planning
Empty	T	44.04	47.43	43.52	46.53	55.89	38.90	46.61	51.77
	P	40.59	36.77	42.20	36.77	32.96	43.33	38.49	36.24
1.2.3	T	1.58	.77	1.31	1.46	2.40	1.87	1.62	2.51
	P	1.03	.70	.61	1.02	.67	2.01	.98	3.23
4	T	6.78	8.85	6.44	3.09	3.58	9.20	6.11	1.28
	P	.57	.23	2.69	.40	.51	1.08	.93	.00
5	T	2.10	1.12	.47	1.19	.69	1.63	1.15	.39
	P	1.41	.47	1.04	.52	.35	.42	.69	.00
6,7,8	T	.89	2.45	.64	4.08	2.07	.96	1.83	1.19
	P	1.02	1.22	1.68	5.01	.95	.61	1.70	3.39

Empty refers to moves without any social-affective meaning.
Category 4 = agreement connected with the correctness of a preceding statement
Category 5 = criticism connected with the correctness of a preceding statement

Authority relationships (Aspect E), operationalized as I/I+D ratio (the share of teacher indirect influence of the total amount of his influence), gave an average measure of .39 in our material. Variances within aspect E appeared to be rather

small but during joint planning sessions teacher influence was more indirect (.56):

Class							Joint
200	300	400	500	600	800	Total	Planning
.39	.39	.38	.35	.37	.45	.39	.56

Flexibility of the teacher (Aspect F), rated on a 0 to 2 scale, was on the average 1.4 with considerable inter-teacher variation:

Class						
200	300	400	500	600	800	Total
1.70	1.22	2.00	.90	.79	1.90	1.39

Pupil participation (Aspect G) was operationalized, first, as an evenness of the distribution of verbal acts, and second, as a share of PP sequences of all the sequences. The last mentioned percentage was 11 on the average, with a range of 5 to 15. Pupil participation in the verbal interaction appeared to be rather restricted because the teacher's share of the moves comprised on the average 57 %; moreover, pupil participation was quite uneven. Individual actors and targets have been identified but the results concerning individual pupils' participation, the amount and quality of their verbal interaction, are not yet available.

6. Connections between the aspects of the instructional process

Table 6 summarizes rank orders within the different aspects. The following assumtions can be presented on the basis of these figures: The more variable the use of different activity forms is, especially the use of pupil-centered forms, the

Table 6. Connections between the Aspects of the Instructional Process

Aspect and its operationalization	Class 300	600	500	400	200	800
A. Division of labor & responsibility, and grouping of pupils - pupil-centredness and many-sidedness of activity forms	6	5	4	3	2	1
B. Formal characteristics of verbal communication - pupil-centredness +)	5	6	3	2	4	1
D. Climate of the classroom - share of positive moves of all moves with social-affective properties	5	2	6	4	3	1
E. Authority relationships - $\frac{I}{I+D}$	3	5	6	4	2	1
F. Flexibility of the teacher - rated flexibility	4	6	5	1	3	2
G. Pupil participation - evenness of participation - share of PP sequences	4 5	1 6	6 4	5 1	3 3	2 2
H. Goal-related pupil behavior - clearness, pleasantness, and consciousness of the plan	3	6	5	4	1	2

Biggest differences are indicated by underlining figures.

+) Reversed order based on the following components: share of teacher talk of all interaction, share of STR and suggestions of all teacher talk, share of answers of all pupil talk.

more probably

- verbal communication is pupil-centered
- the participation of the pupils is spontaneous
- the teacher acts flexibly, and principally, indirectly
- the level of pupils' goal-relatedness is high
- the emotional climate of the classroom is characterized by positive emotions.

The rank order of the classes differs in some aspects from the general trend. This is especially the case with class 600 (Aspect G: evenness of pupil participation and Aspect D) and class 300 (Aspects F and H).

The differences in the position of class 600 are quite easy to explain: the pupils participated mainly by responding and the teacher tried to ask questions of all pupils evenly, which caused evenness in participation although the share of the PP sequences and the spontaneity of the pupils were low. The climate of class 600 was not as warm as the position of the class implies, because the moves with positive social-affective properties were mostly the teacher's moves. The pupils had less social-affective moves than the average in these six classes and the frequency of category 2 showed the smallest tension release of all.

The position of class 300 in aspects F and H cannot be explained by process variables, and not clearly by frame variables either. This case implies that it is possible to avoid extremeness in the teacher's direct influence and rigidity and to create a general level of pupils' goal-directedness although the teacher uses almost only teacher-centered activity forms.

7. Teacher training and the DPA Helsinki project

The most important and the most difficult problem in teacher training is how to instruct the student-teacher in the conduct of the teaching process. As we know, the main cause of this difficulty is the lack of an overall and comprehensive theory of instruction. Because we do not understand the structure of teaching process and because the study of teaching has not been able to find invariances in it, one has been compelled to act upon intuition when guiding the student-teachers. The supervisors act according to tradition and to their own educational views. A new generation of teachers must be educated in spite of the fact that we understand the phenomenon called 'teaching' very poorly (NUTHALL & SNOOK 1973, SNOW 1973).

One of the greatest problems in this connection is how much we can give responsibility to student-teachers in the planning and realization of the instruction. It is not preferable that we leave student-teachers alone with their decisions. But it is not a better solution to conduct them in detail and tell them exactly how certain contents must be taught. It has been usual - at least in Finland - that the emphasis has been laid on detailed directions. Student-teachers have not usually been allowed to make their own decisions when planning instruction.

Finnish experts in didactics (the terms didactics and didactical refer here to their use in the German pedagogical literature) are not content with the state of affairs. They seem to think quite unanimously that the development of a teacher's didactical thinking is an important educational aim. The term was originally put forth by MATTI KOSKENNIEMI (KOSKENNIEMI & AL. 1965). According to him a didactically thinking teacher

works like a researcher. She analyses and evaluates instructional situations using her theoretical knowledge, and takes pupils' prerequisities into consideration, too. A didactically thinking teacher cannot act mechanically, just following given prescriptions. Although she acts instinctively to some extent, she, at the same time, analyses the instructional process from various sides. This takes place in the preactive phase of instruction, as well as in the interactive phase, when the teacher and pupils are planning together and when the plans are realized, and also in the evaluation phase (see Fig. 1).

There is, however, tha crucial problem how to train student-teachers in this skill. It is quite evident that teachers can be conducted to didactical thinking during their training years, and it is equally evident that they can be alienated from it as well. There are two points of view which must not be neglected if we appreciate the development of didactical thinking in student teachers.

First, teachers must be trained to look at the instructional process more widely than it has been usual. Although we have no intention to demand that teachers should become researchers in the proper sense of the word, one important prerequisite of didactical thinking is, however, that they know some features of the research on teaching. Our results from the DPA Helsinki research paradigm have proved that when a student-teacher becomes familiar with the paradigm and the taxonomy associated with it, this may open her eyes in many ways. Student-teachers can be made to understand that the teacher is only one, although presumably the most important single factor in instructional process. Frame factors, like pupil variables and social structure of the class, have their important influences on the teaching process. Moreover, background variables, and their less direct connections with the

instructional process, represent the educational environment at large, and they must be taken into consideration. If a teacher is not aware of such social-affective and social-demographic features, and, if she does not understand the complexities involved in teaching, her possibilities to think didactically will be essentially reduced.

It is also important that teachers should regard teaching as a process. Past experiences always have influence on the present situation. If we only look at separate lessons, our undertanding of teaching remains very restricted. This point of view is explicit in the DPA Helsinki paradigm.

Second, we can train student teachers in didactical thinking. The method we use is to make them familiar with systematic observation of instructional processes. As to the motivation of student teachers, it is important that they have a chance to observe their own lessons. Feed-back from observational courses, where the student teachers were made familiar with the DPA Helsinki taxonomy, has been encouraging. Student teachers at the Teachers College in Helsinki commented, e.g. that "systematic observation of teaching made me understand the multidimensional character of teaching, and I have now a more critical attitude towards the 'facts' of teaching". Students also put forth that the mechanical training in coding does not make much sense. They thought that it was important to discuss different ways to solve problems in instructional situations. Only this is how an ability to didactical thinking can be developed.

References

Bellack, A. A. & Kliebard, H. M. & Hyman, R. T. & Smith, F. S. 1966. The Language of the Classroom. New York: Teachers College Press.

Bishop, L. K. 1971. Individualizing Educational Systems. New York: Harper & Row.

Bjerstedt, A. 1971. Cooperation, Independence, Mental Agility: Some Aspects of Preparedness for the Future as an Educatioal Objective. Pedagogisk-psykologiska problem No. 36. Teachers College, Malmö, Sweden.

Clark, L. H. & Starr, I. S. 1967. Secondary School Teaching Methods. New York: Macmillan.

Dunkin, M. & Biddle, B. 1974. The Study of Teaching. New York: Holt, Rinehart & Winston.

Hoetker, A. J. & Ahlbrand, W. P. 1969. The Persistence of Recitation. American Educational Research Journal 6, 143-169.

Hyman, R. T. (Ed.) 1962. Contemporary Thought on Teaching. Englewood Cliffs: Prentice-Hall.

Jackson, P. W. 1962. The Way Teaching Is. Hyman 1962, 6-12.

Koskenniemi, M. 1977. Structural Elements of the Instructional Process. DPA Helsinki Investigations I. Research Bulletin No. 48, Institute of Education, University of Helsinki.

Koskenniemi, M. et al. 1965. The Development of Young Elementary School Teachers. Acad. Sci. Fenn. B 138. Helsinki.

Koskenniemi, M. & Komulainen, E. 1974. Investigations into the Instructional Process. X. Report of the DPA Helsinki, Phase One. Research Bulletin No. 39, Institute of Education, University of Helsinki.

Koskenniemi, M. & Karma, K. & Martikainen, M. (Eds.) 1974. DPA Helsinki System for Describing Instructional Processes. Research Bulletin No. 42, Institute of Education, University of Helsinki. Reprinted also in Classroom Interaction Newsletter 10, 1975.

Lundgren, U. P. 1972. Frame Factors and Teaching Process. Stockholm: Almqvist & Wiksell.

Mitzel, H. 1957. A Behavioral Approach to the Assessment of Teacher Effectiveness. New York: Division of Teacher Education, College of the City of New York. (Mimeo)

Nuthall, G. & Snook, I. 1973. Contemporary Models of Teaching. Travers 1973, 47-76.

Snow, R. E. 1973. Theory Construction for Research on Teaching. Travers 1973, 77-112.

Travers, R. M. W. (Ed.) 1973. Second Handbook of Research on Teaching. Chicago: Rand McNally.

Wheeler, D. K. 1967. Curriculum Process. London: Hazell, Watson & Viney.

von Wright, G. H. 1971. Explanation and Understanding. London: Routledge & Kegan Paul.

The Way Thinking Is: How Do Teachers Think and Decide +)

by

Pertti Kansanen

1. Is thinking necessary?

The independent role of teacher thinking has been a controversy in the teacher education almost always. Some people seem to believe that all the teacher needs is managerial skill and good teaching material. Or she can do her work with some ready made programs or flow charts without making any decisions about the objectives or content of teaching. On the other hand, some people are convinced that the teacher must have a readiness to choose between many alternatives and to make independent decisions. According to this pattern of thought the teacher must have a good knowledge of the curriculum and a thorough insight into the behavior of her pupils. Finally, some people think that both of the afore mentioned skills are needed and they are not mutually exclusive. This last alternative is a reasonable one but it makes great demands on the teacher education program.

Another controversy in the teacher education has been the amount of theory and practice and the relationship between them. It is self-evident that every teacher must have possession of the basic teaching skills e.g. of such miniskills as how to make questions or how to start a lesson or how to react to a pupil's answer etc. as well as of such macroskills as how to keep order in the classroom or how to succeed in evaluating the discussion during the teaching process. But how about the knowledge of theoretical and philosophical questions? If you ask teachers themselves about the necessity

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of this kind of knowledge they most often do not see the importance of it. Theoretical competence is, however, the best antidote for those methods which are of current interest or which are in vogue e.g. group work, mastery learning, behavior modification, observation techniques etc. Without consideration and criticism every method turns against its user. The skill how to apply needs thinking and decision making.

2. Research examples on teacher thinking

It is surprising how new the research area on teacher thinking is. Perhaps these questions have always been implicit in the research concerning curriculum theory or teacher effectiveness or educational objectives. However, the specific interest in the ways and models of teacher thinking is quite new.

The so called rational and logical planning model originally developed by RALPH W. TYLER and supported by many others is the most famous model for teacher thinking. It has been strongly criticized and it has also been used onesidedly. According to this model the planning begins with objectives, after that come the selection of content, organization of teaching activities and evaluation. The phases are supposed to appear in this specific order. Particularly the position of educational objectives has been problematic. Especially PHILIP W. JACKSON has argued against this model and insists that teachers first choose the teaching activities and do not think on the basis of educational objectives (JACKSON 1962, JACKSON & BELFORD 1966).

The easiest way to empirically investigate teacher thinking

is to concentrate on the preinteractive phase of the teaching process and try to find out how teachers are planning their work. ZAHORIK (1975) asked 194 teachers to list the decisions they make prior to the teaching. 81 % of the teachers made a decision about the activities but this decision was in only 3 % of the cases the first to be made. 51 % of the teachers listed the content as their first decision and only 28 % started their planning with objectives. ZAHORIK could conclude that the ends-means planning model prescribed by TYLER or by POPHAM may be more of a theoretical formulation than a functioning reality.

PETERSON, MARX and CLARK (1978) asked 12 experienced teachers to have three lessons to three small groups of students. The teachers got the teaching material and the objectives in advance. Before teaching they were asked to plan their teaching during 90 min and they were told to use the so called "thinking aloud" technique. The plannings were recorded and analyzed. The results indicated that most of the teachers' statements focused on the content and secondarily on the activities. The smallest proportion of statements was given to the objectives even though the teachers were given a list of student objectives. Later PETERSON and CLARK (1978) have reported their results concerning the relationship between planning and thinking during the teaching. Those teachers who had made statements about objectives were not inclined to change their behavior. That was interpreted to depend on the rigid devotion to original planning and objectives.

YINGER (1978) made a case study of one elementary teacher's planning decisions for a five-month period. During the first phase of data collection YINGER spent 40 full school days observing and recording the teacher's activities in both the preactive and interactive phases. In the second phase the data

was collected by observing her behavior in the Teacher Planning Shell. Two central aspects emerged and they were planning for instructional activities and the use of teaching routines. The activities divided into seven subcategories: location, structure and sequence, duration, participants, acceptable student behavior, instructional moves, and content and materials. Decisions about content and materials were the most frequent decisions to be made. The teaching routines divided into four types: activity routines, instructional routines, management routines, and executive planning routines. YINGER also developed a model for planning research.

CLARK and YINGER (1977) have made a summary of research on teacher thinking and they organized their article into four parts: teacher planning, teacher judgment, teacher interactive decision making, and teachers' implicit theories. It is the first one and the last one which are of interest in this paper.

According to SHAVELSON (1973 and 1976) the most important basic skill is the teacher's ability to make decisions. SHAVELSON's focus is on the conscious decision making and he examines this characteristic mainly from a theoretical point of view.

3. Research on purposiveness in the teaching process

As part of a larger research program (DPA Helsinki) we had the opportunity to interview six comprehensive school teachers and ask about their ways of thinking during the preinteractive phase of teaching. Some questions were also asked about the teachers' implicit theories and philosophical principles. The main objective of the study was to find out what role the

curriculum and the educational objectives played in the daily working habits and how well the goals of the official curriculum were internalized by the teachers. The main results are to be seen in Table 1.

Table 1. A summary of the teachers' activities during the preinteractive phase of the teaching process

Teacher	A	B	C	D	E	F
Long-term planning	+	-	+	(+)	-	+
Short-term planning	+	(+)	+	(+)	(+)	+
Form of the plan						
mental outline	+	+	+	+	+	+
following the textbook	+	+	+	(+)	+	+
written outline	+	-	(+)	-	-	+
written outline in detail	(+)	-	-	-	-	-
Facilities in planning						
nationwide curriculum	+	-	(+)	-	-	+
local curriculum	+	-	+	-	-	+
textbook	+	+	+	+	+	+
teacher's guide for the textbook	+	+	+	+	+	+
colleagues	-	-	(+)	-	-	-
background material	(+)	(+)	(+)	(+)	(+)	+
Content of the plan						
forms of activities	+	+	+	+	+	+
AV-material	+	(+)	(+)	-	(+)	+
homework	(+)	-	-	-	-	-
evaluation	(+)	-	+	-	-	+

\+ = activity present regularly or quite regularly
(+) = activity present sometimes
\- = no activity present

One of the clearest findings was that the teachers did not think on the basis of the objectives. None of them ever mentioned the objectives as guidelines in their thinking. Perhaps this may depend on the different terminology between the

teachers and research workers. When e.g., they are discussing pedagogical principles the objectives may be at the back of their mind. In any case, the first requirement towards purposiveness in the teaching process is the knowledge of the curriculum and the objectives. But the everyday practice in the field is that the teachers know the teaching material, and through this indirect way they are familiar with the curriculum and with the objectives. But as we know, all the objectives do not appear in the teaching material, not at least in the textbooks.

When looking at the table columnwise one can notice that the planning activities are cumulative. If the teacher is planning regularly, she also uses the curriculum in her planning and takes evaluation at least sometimes into consideration. All the six teachers have in common that they make at least mental notes about planning, they use textbooks and teachers' guides for those textbooks and they make decisions about forms of activities. It seems that it is quite easy to divide these six teachers into two types: those who are active and those who are passive during the preinteractive phase of the teaching process. There were also quite interesting tentative relationships between planning activity and personality characteristics as well as attitudes.

4. Theoretical perspectives on purposiveness

One has to meet at least the following three requirements to be able to behave purposively in the teaching process: (1) one has to know the current curriculum and the educational objectives, (2) one has to possess a readiness to interpret the objectives in the right way so that one's thoughts are in agreement with the curriculum, and (3) one has to agree with the

goals personally and internalize them into one's everyday teaching practice. That is to say that the teacher takes her criteria of decisions from the curriculum and from the goals. But how to see the difference between an intentional and unintentional teaching process? In practice teachers need not know the curriculum, they have textbooks written in harmony with the curriculum. In that case the teaching process is explained quasi-teleologically and it is guided from the outside (see von WRIGHT 1971, 58-61). Behavior can be purposeful without personal goals in the context of educational system but it becomes purposive when it is intentionally aiming at certain ends.

Must the teacher behave purposively? And how about the pupils? The curriculum is written in such a way - at least in Finland - that all goals do not emerge in the teaching material. The general aims which are supposed to be present in the teaching process all the time and which all teachers are responsible for won't realize if the teachers do not know the curriculum and the goals. It is easy to see how important a person the teacher in the teaching process really is.

In investigating teacher thinking and behavior it is possible to resort to the theoretical work concerning the explanation of human behavior. One can be guided by CH. TAYLOR's (1964) explanation by purpose, by von WRIGHT's (1971) analysis of causal and teleological explanation, by HARRÉ and SECORD's (1972) examination of explanation of social behavior, by GAULD and SHOTTER (1977) and their hermeneutical psychology or by WOODFIELD (1976) with his more general aspects of teleology. The most important thing in addition to the theoretical approach is to talk with teachers and to get them to tell about their work and thinking habits.

References

Clark, C. M. & Yinger, R. J. 1977. Research on Teacher Thinking. Curriculum Inquiry 7, 279-304.

Gauld, A. & Shotter, J. 1977. Human Action and Its Psychological Investigation. London: Routledge & Kegan Paul.

Harré, R. & Secord, P. F. 1972. The Explanation of Social Behavior. Oxford: basil Blackwell.

Hyman, R. T. (Ed.) 1971. Contemporary Thought on Teaching. Englewood Cliffs: Prentice-Hall.

Jackson, P. W. 1962. The Way Teaching Is. Hyman 1971, 6-12.

Jackson, P. W. & Belford, E. 1965. Educational Objectives and the Joys of Teaching. School Review 73, 267-291.

Peterson, P. L. & Marx, R. W. & Clark, C. M. 1978. Teacher Planning, Teacher Behavior, and Student Achievement. American Educational Research Journal 15, 417-432.

Peterson, P. L. & Clark, C. M. 1978. Teachers' Reports of Their Cognitive Processes During Teaching. American Educational Research Journal 15, 555-565.

Shavelson, R. J. 1973. What Is the Basic Teaching Skill? Journal of Teacher Education 24, 144-151.

Shavelson, R. J. 1976. Teachers' Decision Making. Yearbook 1976, 372-414.

Taylor, Ch. 1964. The Explanation of Behavior. London: Routledge & Kegan Paul.

Woodfield, A. 1976. Teleology. Cambridge: Cambridge University Press.

von Wright, G. H. 1971. Explanation and Understanding. London: Routledge & Kegan Paul.

Yearbook 1976. The Seventy-fifth Yearbook of the National Society for the Study of Education, Part I: The Psychology of Teaching Methods. Chicago.

Yinger, R. J. 1978. A Study of Teacher Planning: Description and a Model of Preactive Decision Making. Research Series No. 18, Institute for Research on Teaching. College of Education, Michigan State University.

Zahorik, J. A. 1975. Teachers' Planning Models. Educational Leadership 33, 134-139.

Activity Forms and the Formal Properties of Instruction

by

Matti Koskenniemi

This paper deals with the activity form in the instruction as a part of the instructional process itself: the concept, the classification of the phenomenon, and its relations to other components of the process of instruction. The taxonomical solutions which *eo ipso* are the prerequisite for the description of the process of teaching and learning, must be based on clear-cut concepts. Such concepts have, moreover, to undergo a validation by means of empirical analysis.

The following pages are related to some practical problems of teacher education. In order to help student teachers in their didactic thinking (i.e., in analyzing instructional situations), training in observing and analyzing instructional processes have been found useful. In this connection logical qualities of a classification system used to clarify the instructional processes must be considered important. Development in didactic thinking presupposes that the concepts are clearly defined. Without such concepts various aspects and components of the instructional processes can not be identified and held apart.

1. "Teaching Method" as a Concept

The traditional term "teaching method" involves systematic

modes or styles in organizing and realizing the actual instructional processes in order to reach the objectives concerned. However, categories of a "teaching method" are very diversified and taxonomical systems consisting of these categories inconsistent. There are various theoretical frameworks related to this phenomenon, and consequently the definitions of the "teaching method" are incommensurable. This is obvious when different "methods" are compared in relation to efficiency. Therefore, as GAGE (1968, 124-125) has stated, one should break down "the complexities that have proven to be so unmanageable when dealt with as a whole". For instance the new curriculum for the Finnish comprehensive school (1970) does not use the term "teaching method" at all; instead, instructional modes are described in terms of "activity (or work) forms".

WISPÉ (1953) criticized the use of "teaching method" as a variable for the empirical studies. Definitions of this concept confirm his standpoint. The classification of "patterns of instruction" presented by STILES (1952) as well as other taxonomies produce, as WALLEN & TRAVERS (1963) have stated, categories too complex for empirical research: they are mainly based on the concepts inherent to philosophical traditions or on needs of particular groups of teachers. Therefore it is understandable that many educationalists now prefer to use "teacher behaviors" instead of "teaching methods" (GAGE 1969). It is, however, in spite of this change, difficult to find ary logically impeccable category system for the instructional processes.

For example, "models of teaching" by JOYCE & WEIL (1972) is a rather complex typology of teaching modes and does

not constitute a hierarchical taxonomy. DUNKIN & BIDDLE (1974, 181) have tried to avoid this dilemma by using "lesson format" instead of "teaching method" as a basic category of the characteristic ways of conducting classroom interaction. But this new concept, too, is very complex: it comprises the social psychological structure of the instructional process as well as its function ("what classroom groups are to"), i.e., the subject-matter or at least the way to learn it.

BERLINER & GAGE (1976, 5) have defined the "teaching method" as "instructional processes" instead of "patterns of teacher behavior". But this change has not led to any new taxonomical system. In the yearbook "The Psychology of Teaching Methods" (1976) classification still is traditional and logically insufficient.

Despite of a number of critical remarks (e.g., HERBERT 1967, 5; TRAVERS 1971, 27-32; ROSENSHINE 1976, 338) no satisfactory taxonomy of instructional phenomena has yet been presented. This is partly due to the lack of an ambiguous concept of the instructional process. Another explanation seems to be that modes of teaching have been defined in terms of a lesson, not by taking into account the fact that a lesson in most cases consists of periods which differ from each other. DUNKIN & BIDDLE, and HERBERT, e.g., have constructed instructional categories in terms of a whole lesson only, and the same is true as regards the German-speaking area of didactics.

2. Components of the Instructional Process

How components of the process of instruction (or the

"method", the "mode" or "styles" of teaching, or "teacher behaviors") are defined depends on the views based on the nature of instruction, and also on the objectives of teaching. In some cases instructional processes are seen as general phenomena, as indipendent of particular goals (e.g., GAGE 1969, 13), while some educators think that the structure of instruction cannot be separated from its objectives (e.g., JOYCE & WEIL 1972). This dilemma seems, however, to be a minor one compared with tha one created by diverging theoretical standpoints regarding the nature of instruction.

Depending on what are seen as central features of the instruction, some components assumed to have minor importance are left outside the paradigm which represents the process as a whole. In some earlier investigations "teacher behaviors" have been seen very central, and the other components of instruction (e.g., pupils and the interaction between the teacher and pupils) were to be overshadowed by what the teacher was doing. At the same time, some researchers have carried out multiple classifications of verbal expressions in the classroom omitting the instructional situation as a whole (SPANHEL 1971; 1973). On the other hand, analysis and classifications of the classroom intercourse have been conducted within the instructional entity, as BELLACK (moves and cycles) and SMITH (episodes and ventures).

An instructional process can be divided into temporal units also in other ways. One solution is the Herbartian "formal steps", with each step having a function in the learning process. Some West-German and most socialist educators still prefer this way (cf. also de LANDSHEERE & BAYER 1969). LUNDGREN (1972, 234-236) has differentiated

the so-called "themes" which are characterized by the subject-matter and/or the psychological processing of these. The instructional process can further be broken into units by using the social configuration as a criterion, or by taking participants' roles and their meaning into consideration.

Fairly little attention has, however, been paid to the problem of the lesson units. DUNKIN & BIDDLE (1974, 75-77) have used the terms "phenomenological (or natural)" and "analytical" for the units but have not discussed these any further. Nevertheless, the question of unit is a central one, because properties of the instructional process have a considerable variation during a lesson. Without dividing the flow of instructional events into sub-units the classification is bound to remain too complex.

In the following, taxonomies in which whole lessons are the objects of the classification are, therefore, not taken into consideration although they may present categories which are interesting from a theoretical point of view (e.g., PERKINS 1964; JOYCE & HODGES 1966; HERBERT 1967; BLANKERTZ 1972; BENNETT & JORDAN 1975).

3. Taxonomical Solutions

A comparison of various taxonomies as regards their components is difficult due to differences in terminology used. For instance, the terms "formal properties", "activity forms", "organization", and "grouping" may have almost the same meaning. In many cases the distinction between "formal characteristics" and "content" is not clearly drawn. On the other hand, it may be quite impossible to

make such a distinction - especially if the instructional process is considered an interactive process.

In the following some taxonomical systems are briefly reviewed. In them the hierarchy of the components varies, and which of these components has been considered the central one can be seen from what criterion is used in dividing the lesson (or some other period of instruction) into smaller units. The problems of reliability and validity of the taxonomical procedure will be overlooked in this connection.

In the didactic system of PETERSEN (1937) - unfortunately very little known in the English-speaking world - the basic unit of the instruction is the educational situation (die pädagogische Situation). These situations are defined in terms of learning processes generated from the surrounding reality. Activities thus brought along (discussion, play, work and assembly) correspond with various learning processes. In "die pädagogische Tatsachenforschung" - methodologically already outdated - educational situations are divided into steps (Schritte) which refer either to the content (educational purpose) or to the form (instructional function).

The classification of classroom activities presented by FLANDERS (1962) is based on the purpose of a particular activity: planning, work, evaluation, and administration. These units are further subdivided according to whether the teacher or pupils are initiators for that activity. In his interaction analysis (FIAC) which is based on verbal expressions, FLANDERS (1970) operates with concepts "pupil's perception of goals", "teacher influence (or initiative)", "opportunity to social contacts", and

"freedom of ideas". Even if temporal units within the flow of instruction are not used, it can be considered that the classification is mainly based on the pupil's intentionality.

In another well-known system by BELLACK (1966) the functional meaning of the classroom language is the main criterion in formation of the smallest temporal units (moves). In this taxonomy moves are further classified according to the subject-matter and its processing, management of the learning, and the pedagogical function of verbal expressions. BELLACK also makes a distinction between the larger units (cycles), which are classified either on the basis of their formal properties ("formally ordered teaching cycles") or on the basis of the topic ("temporally ordered or topical cycles").

According to SMITH & MEUX (1970) the subject-matter and the way of its processing are essential, and independent of each other, as components of the instructional process. This process consists of episodes (tactical units characterized by certain logical operations) and more extensive ventures. Consequently, the flow of instruction is broken into units on the basis of the logic of teaching.

In the taxonomy of GUMP (1967) the temporal units (segments) are considered in relation to the lesson concern, i.e., the unchangeableness of subject-matter. These segments are then classified on the basis of four independent properties: leadership pattern, pupil activity demand, action sequencing, and group quality.

Temporal units (episodes) in the system of ADAMS & BIDDLE (1970) are constructed in the same way as in that of GUMP. Instruction is seen as a transactional process which has

functional (content and mode) as well as structural (communication structure, position, actor role, and participants' placement) properties.

In the GDR and the USSR the classification of the lesson into smaller units is based on the organization of instruction: recitation, individual work, group work (NEUNER 1978, 299-303). These units are according to their particular function in the learning process divided further into so-called actions (Verfahren).

In the DPA Helsinki Project (1974) **instruction** has been defined as a flow of interactions in order to develop the personality of a pupil. In describing the instructional processes the DPA System is based on BELLACK's pedagogical moves further classified in terms of social affective behavior (BALES) and by the mode of teacher influence (FLANDERS). In addition, the lessons are divided into temporal units (didactic situations) based on the division of labor and the responsibility, and the grouping of pupils. Each such a situation is represented by certain activity forms: teacher-centered (teacher presentation, teacher questioning, joint exercises) pupil-centered (individual work, performances of individuals or groups, group work), or co-operative (instructional discussion, assembly). This kind of definition of the activity takes thus into account not only how the participants are grouped but primarily the extent of the responsibility the teacher and the pupil take and how this responsibility reflects the decision of how to work in an instructional situation.

As additional aspects of the instructional process in the DPA Helsinki taxonomy the following have been regarded as central: the formal characteristics of verbal communica-

tion, the content and its relevance to pupils, classroom climate, authority relationships, flexibility of the teacher, pupil´ participation, and goal-related behavior of the teacher and the pupils.

A variety of fundamental taxonomical principles used in mapping instructional processes is clearly a product of diverging theoretical and ideological views concerning the nature of this phenomenon. But difficulties arising from differences in taxonomical solutions can also be useful in penetrating that largely unknown area. Especially when applied together on the same observational data, a multiple or cross-coding can, i.a., uncover hidden relationships between categories and thus help in clarifying the taxonomical system. In comparing periods which were homogeneous as regards the activity form, DPA Helsinki investigations have shown that the classroom climate, the authority relationships, pupils´ participation and their goal-related behavior have a clear tendency to covary. This cluster (cohesion) had, however, no connections with the content of instruction (KOSKENNIEMI 1977).

4. "Content" and "Form" of the Instructional Process

The use of the term "formal properties" of the instructional process varies; it may mean, e.g., grouping and guiding of pupils, planning, organization and management, and evaluation. That term is often used in the traditional sense of a "teaching method". The "content" of instruction, on the other hand, is seen in a much more unambiguous way: as the subject-matter (including affections) to be learned. According to KILPATRICK such a dichotomy is misleading; the "content" cannot be regarded only as something offered

to pupils but also as an essential element of the instructional process proper.

The process of instruction has to be planned and organized in some way: decisions about timing, grouping, and responsibility should be made. These "formal" properties influence the interactive process in which participants, dependent on each other, are playing certain roles. The narrow meaning of the term "formal properties" refers to the structural organization and to the function in the process of instruction. These properties regulate the interactions. The relationship between the structuralization and the process of interaction is, however, reciprocal: activity forms appearing in the classroom life can be as well a cause as a consequence of interaction. The former alternative is the more plausible one because activity forms can more easily be planned in advance.

This reciprocality already appears in the didactic theory of PETERSEN. Also the main categories of "patterns of instruction" presented by STILES (teacher-centric, pupil-centric, cooperative) refer to the division of the responsibility as the most central taxonomical principle. Formal characteristics of the interaction play, at least partly, an important role in the system of BELLACK, too.

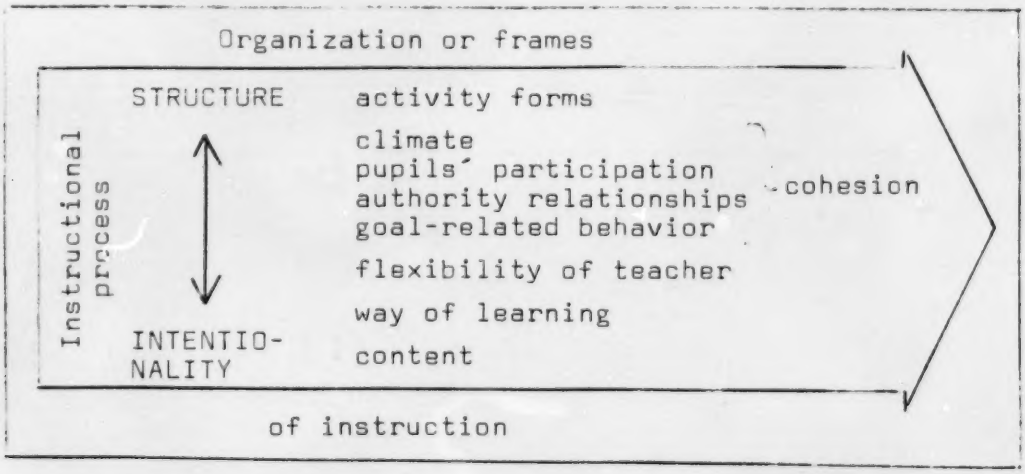
5. Activity Forms in the Paradigm of DPA Helsinki

On the basis of DPA Helsinki investigations the following paradigm of the instructional processes has emerged, a paradigm in which social structure and intentionality are considered the main elements of that process.

Social structure manifests itself primarily as the teacher and pupil roles which regulate the interaction. These roles are reflected in the activity forms, in the division of labor and responsibility between the teacher and pupils, and in the grouping of the pupils. Other characteristics of the social structure are the climate of the classroom and the participation of pupils.

The other main element of the process of instruction, intentionality, is represented by the content and the way of learning (cognitive properties of the verbal communication). The authority relationships and the goal-related behavior as well as the flexibility shown by the teacher in striving at educational aims are connected with the intentionality and are also seen as central aspects.

However, the social structure and the intentionality are not independent of each other. These relationships can be illustrated by a continuum in which the activity forms and the content represent opposite poles:



References

Adams, Raymond S. & Biddle, Bruce J. 1970. Realities of Teaching: Explorations with Video Tape. New York: Holt, Rinehart & Winston.

Bellack, Arno A. & al. 1966. The Language of the Classroom. New York: Teachers College, Columbia University.

Berliner, David C. & Gage, N. L. 1976. The Psychology of Teaching Methods. Yearbook 1976, 1-20.

Dunkin, Michael J. & Biddle, Bruce J. 1974. The Study of Teaching. New York: Holt, Rinehart & Winston.

Flanders, Ned A. 1962. Teacher Influence, Pupil Attitudes, and Achievement. Mimeo. Ann Arbor: University of Michigan.

Flanders, Ned A. 1970. Analyzing Teaching Behavior. Reading, Mass.: Addison & Wesley.

Gage, N. L. 1968. An Analytical Approach to Research on Instructional Methods. Journal of Experimental Education 37, 120-125.

Gage, N. L. 1969. Teaching Methods. Encyclopedia of Educational Research (Ed. Robert L. Ebel) 4th ed. 1446-1458. New York: Macmillan.

Gump, P. V. 1967. The Classroom Behavior Setting: Its Nature and Relation to Student Behavior. Washington, D. C.: U. S. Bureau of Research, H. E. W.

Herbert, John D. 1967. A System for Analyzing Lessons. New York: Teachers College Press.

Joyce, Bruce J. & Weil, M. 1972. Models of Teaching. Englewood Cliffs, N. J.: Prentice Hall.

Koskenniemi, Matti. 1977. Structural Elements of the Instructional Process: Activity Forms and Content. DPA Helsinki Investigations I. Research Bulletin, Institute of Education, University of Helsinki, No. 48.

Koskenniemi, Matti & al. 1974. DPA Helsinki System for Describing Instructional Processes. Research Bulletin, Institute of Education, University of Helsinki, No. 42.

De Landsheere, G. & Bayer, E. 1969. Comment les maîtres enseignement - Analyse des interactions verbales de l'enseignement. Bruxelles: Ministère de l'Education Nationale.

Lundgren, Ulf P. 1972. Frame Factors and the Teaching Process: Stockholm: Almqvist & Wiksell.

Neuner, Gerhart & al. (Hrsg.). 1978. Pädagogik. Berlin: Volk und Wissen.

Petersen, Peter. 1937. Führungslehre des Unterrichts. Langensalza: Beltz.

Rosenshine, Barak. 1976. Classroom Interaction. Yearbook 1976, 335-371.

Smith, B. Othanael & Meux, Milton O. & al. 1970. A Study of the Logic of Teaching. Urbana: University of Illinois.

Spanhel, Dieter. 1971. Die Sprache des Lenrers. Grundformen des didaktischen Sprechens. Düsseldorf: Schwann.

Spanhel, Dieter (Hrsg.). 1973. Schülersprache und Lernprozesse. Düsseldorf: Schwann.

Stiles, Lindley J. 1952. Methods of Teaching. Encyclopedia of Educational Research (Ed. Walter S. Monroe) rev.ed. 745-753. New York: Macmillan.

Travers, Robert M. W. 1971. Some Further Reflections on the Nature of a Theory of Instruction. Research into Classroom Processes (Eds. Ian Westbury & Arno A. Bellack) 23-43. New York: Teachers College Press.

Wallen, Norman E. & Travers, Robert M. W. 1963. Analysis and Investigations of Teaching Methods. Handbook of Research on Teaching (Ed. N. L. Gage) 448-505. Chicago: Rand McNally.

Wispé, Lauren G. 1953. Teaching Methods Research. American Psychologist 8, 147-150.

Yearbook 1976. The Psychology of Teaching Methods. The Seventy-fifth Yearbook of the National Society for the Study of Education. Part I (Ed. N. L. Gage). Chicago: Rand McNally.

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